II. FEP WORK PLAN 1997-1998

In the fiscal year 1997-1998 the Agency's FEP funded 13 projects at a budgeted cost of $234,000-304,000. Projects sponsored by the FEP in the 1997-1998 Work Plan are discussed below. The information provided for each project includes a brief project description and project status.

1. STREAM HABITAT SURVEYS

Description: Surveys were conducted by Agency staff in cooperation with CDFG to assess the habitat conditions of streams that are potentially suitable habitat for salmonids. Eventually, CDFG hopes to conduct habitat surveys of every stream within the Russian River watershed. Ideal habitat for salmonids include streams with deep pools and aquatic cover (i.e., exposed root wads, woody debris, undercut banks, etc.), a channel of gravel to cobble, and dense riparian tree cover that provides shade and maintains cool water temperatures. Survey results will be used to identify streams in need of enhancement or restoration. Surveys were conducted according to the CDFG Habitat Restoration Manual and were limited to creek sections with flowing or standing water. The budgeted cost of labor and materials to the Agency was $20,000-25,000.

Status: Agency staff surveyed Matanzas, Pool, Mill, Van Buren, Weeks, and Horsehill creeks in 1997-1998. Survey data were entered into CDFG's Russian River Basin Plan database to identify specific areas needing salmonid habitat improvement. Reports for each stream survey were prepared by CDFG. A summary of survey results by creek is as follows:

Lower segment of Matanzas Creek

Matanzas Creek**:** Matanzas Creek is a tributary to Santa Rosa Creek with its confluence in downtown Santa Rosa. The Agency's surveys indicate that approximately 4.5 miles of salmonid spawning and rearing habitat is blocked by a culvert. Over 1,000 feet of the lower creek passes through a large concrete box culvert, which is a barrier to upstream salmonid migration.

Pool Creek: Pool Creek is an intermittent tributary of Windsor Creek located north of Sonoma County Airport. This creek is approximately 5.0 miles in length and most of the creek is low gradient with the exception of the upper headwaters. The Agency conducted surveys along the lower 2.1 miles of the creek. The creek provides marginal habitat for salmonids, due to lack of cover and poor water quality. Most of the summer flow in the lower portion of the creek is from irrigation runoff. Riparian canopy cover ranges from 40-90 percent in the surveyed area. Cattle in the lower one-mile of the creek have disturbed bank and instream habitats. These conditions decrease habitat for salmonids; however, during high winter flows or in the headwaters suitable salmonid habitat may be present.

Mill Creek: Mill Creek is an intermittent tributary of Mark West Creek located east of Mark West Springs. This creek has a total length of 2.3 miles and the Agency's survey covered 1.4 miles. There are many scour and boulder pools along the creek and dense riparian canopy cover (80-90 percent) that provides good habitat for salmonids. Steelhead were observed in 43 percent of sampled pools.

Van Buren Creek

Van Buren Creek: Van Buren Creek is an intermittent tributary to Mark West Creek located northeast of Santa Rosa. This creek extends 3.0 miles through a steep canyon. The Agency surveyed a 1.4-mile reach in the lower portion of the creek and observed poor to good salmonid habitat. Van Buren Creek has a dense riparian canopy with cover of 90 percent and pools with large woody debris. The majority of pools in the survey area contained roach (a native minnow) in the lower reach and juvenile salmonids in the upper reach.

Weeks Creek: Weeks Creek is a tributary of Mark West Creek located northeast of Santa Rosa. The Agency surveyed several sites totaling 0.7 mile along the 3.1-mile creek. Pools were frequently encountered during the survey, but most lacked sufficient stream cover for salmonids. Dense riparian canopy cover of 80-90 percent occurred throughout the survey area. Juvenile salmonids were observed in a single pool.

Horsehill Creek: Horsehill Creek is a tributary of Mark West Creek and is located north of Mark West Springs. This creek has a length of 3.0 miles and the Agency surveyed 0.5 mile of creek. Salmonid habitat in this creek is poor. The low riparian canopy cover of 50 percent has resulted in high water temperatures and limited instream cover for fish. During the rainy season, the upper portions of the creek may be accessible to migrating adult salmonids and isolated pools may persist in summer providing rearing habitat for young fish.

Horsehill Creek with poor salmonid habitat

2. TEMPERATURE COLLECTION

Description: Water temperature monitoring was initiated to determine which streams provide suitable temperature conditions for salmonid spawning and juvenile rearing. These data were then used as part of the Stream Habitat Surveys project in order to prioritize stream restoration. This project was conducted in collaboration with CDFG and Mendocino County Water Agency. The budgeted cost for labor and materials to the Agency was $10,000-15,000.

Status: Agency biologists placed a total of 23 temperature loggers in Humbug, Mark West, Matanzas, Porter, Santa Rosa, and Windsor creeks in early summer 1998. All of the temperature loggers remained in the streams until October 1998. In addition, the Agency supported water temperature monitoring by CDFG and Mendocino County Water Agency in Maacama, Redwood, Yellowjacket, Kellogg, Briggs, Little Briggs, Coon, Mill, Bear, Ingalls, McDonnell, Franz, Bidwell, Austin, Kidd, St. Elmo, Ward, East Austin, Gilman, Thompson, Gray, Devil, Sulphur, Canshea, and Black Rock creeks. Collected temperature data has been compiled in the Mendocino County Water Agency's database and also analyzed by Agency staff to determine the suitability of stream temperatures for salmonids. The results of this study will be used to develop salmonid enhancement projects, such as revegetation along creeks to provide shade and decrease water temperatures.

Agency staff deploys temperature data logger

3. PARCEL OWNERSHIP INFORMATION

Description: Parcel ownership information was required in order for CDFG and the Agency to obtain stream access necessary to conduct field studies for the Stream Habitat Surveys and Temperature Collection projects. Property owners along selected streams were identified through the Agency's TRW database. Both the Agency and CDFG were responsible for notifying property owners to gain access to creeks. The budgeted cost for labor and materials to the Agency was $5,000-10,000.

Status: During spring 1998, property owners along Santa Rosa, North Fork Santa Rosa, and Millington creeks were contacted by mail requesting permission to survey streams on their property. Landowner response to the request was fair with 42 percent responding. Of those responding, 87 percent of landowners granted the Agency access to their property. Sections of the streams where access was denied were not surveyed. Also, the Agency furnished property information to CDFG for their habitat surveys along Dry, Pena, Grape, Wine, Redwood Log, Alder, Hummingbird, Big Sulphur, Little Sulphur, North Branch, Frazier, and Squaw creeks.

4. INSTREAM HABITAT IMPROVEMENTS

Description: The Instream Habitat Improvements project involves enhancing fish habitat in streams identified as needing improvement by the ongoing Stream Habitat Surveys project. CDFG and the Agency continue to collaborate on identifying areas needing restoration to improve salmonid habitat. Proposed restoration activities include instream habitat structures that provide fish cover and create pools, and riparian revegetation.

Status: Instream habitat improvements were implemented at seven sites along Adobe, Felta, Mill, Turtle, and Palmer creeks. The restoration needs and specific improvements at each site are further discussed below.

Adobe Creek: The stream channel along Adobe Creek at the Adobe Road culvert has been downcut 8-10 feet at the downstream side of the culvert creating a barrier to fish migration. Excessive water velocities in the flat-bottomed culvert also reduce fish passage. In summer 1997, a series of large boulders and log weirs were installed below the culvert by the Agency, in cooperation with NMFS, United Anglers, and Sonoma County Probation and Public Works departments. The weirs changed the water and streambed elevations, which decreased the jump height required for fish to enter the culvert. The first weir below the culvert was designed higher than the culvert base to decrease water velocities in the culvert and improve fish passage. Also, native plants were planted to increase the riparian canopy, reduce bank erosion, and lower summer stream temperatures. In winter 1998, the upper two weirs were damaged and required additional work to maintain proper function of the structures. Since the repairs, the weirs have been performing well and adult steelhead migration has been observed. Although the upper weir has decreased water velocities in the culvert, excessive velocities still occur during high flow events. Future modifications are planned to increase fish passage during high flow periods. The budgeted cost for design, labor, and materials to the Agency was $50,000-75,000.

Rock weirs along Adobe Creek during winter flows

Felta Creek Site 1: In 1995, CDFG habitat surveys identified the need for cover and pool habitat along Felta Creek, approximately one mile upstream from the confluence with Mill Creek. During summer 1997, the Agency furnished materials and transportation costs to CDFG for construction of a series of rock weirs to improve salmonid habitat. Approximately 1,200 feet of Felta Creek was enhanced with 10 rock and log weirs. The rock weirs improved salmonid habitat by increasing the number of pools and increasing the depths of existing pools. Pools were further enhanced with the addition of large woody debris to provide cover for juvenile salmonids. In addition, constructing a diagonal log weir and placing boulders along a bank deflected stream flows and stabilized an eroded bank. Total cost for materials and transportation to the Agency was $1,935.

Weirs constructed with cabled boulders and logs

Felta Creek pool created by rock/log weir

Felta Creek Site 2: In 1995, CDFG habitat surveys identified areas with limited salmonid habitat along 3,620 feet of Felta Creek. In early

summer 1998, the Agency supplied materials, labor, and transportation costs to CDFG to enhance salmonid habitat along Felta Creek. Seven log structures were constructed and 300 native alder trees were planted. The log structures increased pool and cover habitat for salmonids. Revegetation stabilized eroding areas and increased canopy cover to improve stream conditions. Total cost to the Agency was $1,331.

Mill Creek Site 1: CDFG habitat surveys conducted in 1995 along Mill Creek identified 10,000 feet of stream lacking cover and pools for salmonids. This site is located approximately 7.25 miles above the confluence of Mill Creek with Dry Creek. In summer 1997, the Agency furnished transportation costs to CDFG and California Conservation Corps (CCC) for improving salmonid habitat along Mill Creek. Seventeen log structures were constructed in pool and flat-water habitats to provide woody cover, increase the depth of existing shallow pools, and create additional scour pools. Total cost for transportation and materials to the Agency was $1,400.

Mill Creek log structure creates fish habitat

Mill Creek Site 2: In 1995, CDFG habitat surveys identified several areas along Mill Creek lacking canopy and instream cover necessary for salmonids. In early summer 1998, the Agency supplied materials, labor, and transportation costs to CDFG for enhancement of 5,235 feet of creek**.** Eight log/boulder structures were built and 1,500 native alder and redwood trees were planted. Log/boulder structures were designed to create scour pools and cover to improve salmonid habitat. Trees were planted to increase bank stability and shade the channel to enhance stream conditions. Total cost to the Agency was $7,888.

Turtle Creek: Turtle Creek is a tributary of the Russian River and was identified by CDFG as lacking cover, pools, and bank stability necessary for salmonids. In summer 1997, the Agency supplied labor, materials, and transportation costs to CDFG to enhance 3,193 feet of salmonid habitat along Turtle Creek. To increase bank stability, eroded banks were recontoured and five willow revetments were constructed. In addition, two willow mattresses were built to control sediment from eroding banks. In 1999, the project was completed by CDFG with the addition of three willow baffles to slow water velocities, filter sediment, and increase bar formation. Total cost to the Agency was $12,603.

Willow revetment along Turtle Creek

Palmer Creek: CDFG habitat surveys conducted in 1995 identified limited instream

cover, pools, and tree canopy necessary for salmonid habitat along 3,000 feet of Palmer Creek. Palmer Creek is a tributary to Mill and Dry creeks. In summer 1998, the Agency furnished CDFG with materials, labor, and transportation costs to restore the section of Palmer Creek. Seven log/boulder structures were constructed and 1,500 native alder trees were planted to enhance stream conditions. Log/boulder structures were designed to create scour pools and cover to enhance pool habitat. Alder trees will increase bank stability and provide shade to reduce water temperatures. Total cost to the Agency was $6,045.

5. NATIVE RIPARIAN PLANT HANDBOOK

Description: In June 1997, the Agency funded Circuit Rider Productions, Inc. to develop *A Guide to Restoring Native Riparian Habitat in the Russian River Watershed*. This guide includes descriptions of riparian species recommended for streamside planting and planting methods. The handbook was developed to aid landowners and community groups with designing and constructing effective riparian restoration projects. By educating the public about erosion and the benefits of planting native vegetation, it is hoped that landowners will begin to restore their own properties. Restoration of the riparian zone would improve salmonid habitat by decreasing erosion and increasing creek shade.

Status: The restoration guide has been completed and free copies are available from the Agency. To date 700 copies of the handbook have been distributed to the public and government agencies. Total cost for development of the booklet to the Agency was $6,200.

6. RIPARIAN AREA FENCING

Description: The purpose of the Riparian Area Fencing project was to restrict livestock from stream areas to allow riparian vegetation to recover, stabilize the streambanks, and decrease animal waste entering streams. The exclusion of livestock from streams enhances habitat for salmonids. A site along Little Briggs Creek was selected as a model fencing project to educate landowners to the benefits of exclusionary fencing and to encourage adjacent landowners to fence their riparian areas.

Status: Little Briggs Creek is a tributary to Briggs Creek and flows into Maacama Creek, a tributary to the Russian River. In 1996, the lack of riparian canopy cover along Little Briggs Creek was identified as a habitat concern for salmonids. In summer 1997, a riparian restoration project was funded by the Agency in conjunction with CDFG and CCC to enhance 2,100 feet of Little Briggs Creek. To enhance the riparian zone, livestock exclusion fencing was installed and native riparian plants were planted.

Cattle exclosure fence along Little Briggs Creek

Total cost for labor and materials to the Agency was $6,789.

7. STREAM CHANNEL RESTORATION

Description: The purpose of the Stream Channel Restoration project is to reconstruct 1,300 feet of channel and provide salmonid spawning habitat along Big Austin Creek. The project also includes bank stabilization and riparian vegetation planting along sections of the stream channel. The downstream movement of materials from historic mining conducted upstream in the 1940s has resulted in degraded stream habitats. The accumulation of sediment led to a braided, multi-channel stream with little riparian canopy or summer flow. The loss of riparian vegetation has decreased streambank stability and led to a large landslide, which has delivered large amounts of sediment into the channel. This project was developed by the Agency in cooperation with the property owners (Jillian and Blake Tyrrell), USFWS, and CDFG. The budgeted cost for labor and materials to the Agency was $25,000-30,000.

Big Austin Creek degraded channel before restoration

Status: In spring 1998, a basin hydrology analysis for the Tyrrell property was completed and project plans were finalized to begin work in summer 1998. The first phase of restoration activities are discussed in the 1998-1999 Work Plan section of this report.

8. WATER QUALITY SAMPLING

Description: This project entails collecting and identifying aquatic invertebrates at several streams identified by CDFG. The invertebrates inhabiting streams (e.g., aquatic insects) are important indicators of water quality. By quantifying invertebrate diversity and abundance in a stream the quality of water can be determined and point and non-point pollution sources identified. This may lead to the development of fisheries enhancement projects to help restore the Russian River Basin. The budgeted cost for labor, materials, and analysis to the Agency was $15,000-20,000.

Status: Agency biologists collected invertebrate samples at 12 sites located along Santa Rosa Creek during fall 1997 and spring 1998. Samples have been collected from these sites each fall since 1995 and each spring since 1996. Samples from four sites have been analyzed. Preliminary results indicate a decrease in water quality from the headwaters of Santa Rosa Creek toward downtown Santa Rosa and a gradual increase in water quality downstream of the city. Also, in cooperation with CDFG, NCRWQCB, and Sotoyome RCD the Agency has supported water quality studies in Green Valley, Ackerman, Robinson, Dutch Bill, Hulbert, Fife, Franz, Porter, Redwood, Blue Jay, Thompson, Devils, Sulphur, Bear Pen, Briggs, Little Briggs, Coon, Bear,

Felta, Palmer, and Angel creeks. Additionally, sampling sites at Oddfellows, Alexander Valley, and Talmadge along the Russian River were supported by the Agency.

9. MATANZAS CREEK FISHWAY

Description: Matanzas Creek Fishway project assessed the feasibility of installing a fishway through a 1,000-foot culvert along Matanzas Creek located in downtown Santa Rosa. This culvert is located at the confluence of Matanzas Creek with Santa Rosa Creek and has been a barrier to fish migration for over 30 years. As discussed above in Item 1, the Agency's habitat surveys of 1997 found 4.5 miles of potential spawning and rearing habitat for steelhead upstream of the Matanzas Creek culvert indicating that a fishway through the culvert would benefit steelhead. The installation of fishway structures has been avoided in the past because structures would increase the likelihood of flooding during a major storm event. However, there are modern fishway designs that facilitate fish passage during most hydrologic scenarios, but return to full flow capacity during major storm events. The budgeted cost for the design of this project is expected to be within the Agency's FEP budget.

Status: Agency engineers have proposed a design for the fishway consisting of eight rubber inflatable weirs to raise the height of the water in the culvert for fish passage during migration periods. During winter storms, the inflatable weirs would be deflated to allow for maximum flood capacity inside the culvert. The Agency is currently in the preliminary design and engineering analysis phase of the project. Also, the Matanzas Creek Fishway Project has been incorporated into the U.S. Army Corps of Engineers' Ecosystem Restoration Study for Santa Rosa Creek. The completion schedule for the fishway is proposed to coincide with the Prince Memorial Greenway Project, which is one phase of the restoration study.

Matanzas Creek culvert during high flows

10. NEIGHBORHOOD STREAM CLEAN-UP

Description: Neighborhood Stream Clean-up projects are conducted to augment the Agency's creek restoration efforts and increase community involvement and awareness of stream and riparian habitats. Community involvement is critical to the long-term success of restoration efforts, particularly for streams in urban areas that are subject to litter and debris accumulation. The Agency assists clean-up event organizers with the coordination of other agencies and local groups. Clean-up events are conducted annually and are on-going. The budgeted cost for labor and materials to the Agency was $20,000-25,000.

Status: In 1997-1998 the Agency coordinated stream clean-up projects at several sites. The following discusses each clean-up event.

Cotati Creek: In early 1998, the Agency provided materials to the City of Cotati for the removal of exotic plant species, replanting of native bunchgrasses, and clean-up of Cotati Creek. Cotati Creek flows into the Laguna de Santa Rosa and eventually into the Russian River. Work gloves and debris bags were furnished by the Agency to help in the restoration and clean-up. Total cost of materials to the Agency was $137.

Paulin and Santa Rosa Creeks: The Agency sponsored two creek clean-ups in conjunction with *Hands Across the County Volunteer Day* on October 25, 1997. Approximately 60 volunteers removed 11 tons of garbage, scrap metal, and tires from Paulin and Santa Rosa creeks. In addition, close to 50 shopping carts were removed from the creeks and returned to various local stores. The event concluded with a picnic to thank volunteers for their efforts during the clean up.

Paulin Creek: In 1997, the Agency cosponsored the clean-up of Paulin Creek with the Sonoma County Assessor's Office. The event spanned the creek from Mendocino Avenue to Administration Drive in Santa Rosa and hundreds of pounds of debris was removed.

Volunteers remove a sofa from Paulin Creek

Roseland Creek: On June 6, 1998, the Agency supplied debris bags, gloves, and 10 Americorp volunteers to help clean-up Roseland Creek. The area was relatively clean, with the exception of the 11 shopping carts that were removed from a ¼-mile stretch of creek.

Russian River: On September 27, 1997, the Agency cosponsored the *10th Annual Russian River Clean-up.* Over 300 volunteers removed trash from 53 miles of river by canoe and on foot. The large effort collected 190 tires, 41 cubic yards of general trash, 21 cubic yards of scrap metal, and over 15 barrels of recyclable material. The Agency was an important participant on the planning team, which publicized the event, coordinated with Americorp volunteers, and obtained sponsorships from local businesses. In addition, the Agency contributed gloves, bags, trucks, and personnel to help in the clean up.

Debris from the Russian River is sorted for recycling and disposal

11. STREAMBANK EROSION CONTROL

Description: The Streambank Erosion Control project consists of stabilizing streambanks and enhancing riparian habitat along privately owned portions of Porter Creek and Matanzas Creek.

These creek sites were severely eroded during the storms of 1996-97, due to a lack of riparian vegetation. Bio-engineered erosion structures were installed to stabilize banks. Up-slope areas were planted with native riparian trees to hold the soil and decrease further erosion. These erosion control projects provided an example to landowners on ways to prevent erosion and the value of maintaining riparian vegetation along streambanks on their property. The budgeted cost for labor and materials to the Agency was $15,000-20,000.

Status: The following describes erosion control activities conducted in the summer of 1997 along Matanzas and Porter creeks.

Matanzas Creek: The Agency constructed erosion control structures to stabilize 350 feet of streambanks along Matanzas Creek to improve potential salmonid habitat. In cooperation with landowners Linda and John Hemenway, the Agency created willow walls, recontoured the streambank, planted riparian vegetation, and relocated a piece of large woody debris. The project improved potential salmonid habitat by decreasing erosion and sedimentation of the creek and reducing water temperatures.

Porter Creek: In cooperation with landowner Charles Cesano, the Agency constructed bio-engineered erosion control structures to stabilize streambanks and improve salmonid habitat along Porter Creek. The Agency created a willow wall, willow mattress, and planted native willows and alders along the creek banks to protect the bank from additional erosion and provide additional riparian canopy. Reduced erosion will lead to improved salmonid spawning habitat and an increase in riparian canopy will lower stream temperatures to benefit salmonids. The cover of this report shows a sequence of three photos of the project site, including flood-damaged banks, installed erosion control structures, and willow cover four years after restoration.

Willow wall will protect bank from floodwaters

12. RURAL ROAD EROSION CONTROL

Description: The purpose of the Rural Road Erosion Control project is to decrease the amount of sediment runoff entering Palmer Creek by repairing a one-mile section of Palmer Creek Road. Fish habitat studies have identified rural roads to be major sources of sediment to streams. Decreasing the sediment load into Palmer Creek will enhance the habitat restoration project on the same stretch of Palmer Creek that CDFG constructed under the Instream Habitat Improvements project (see Section 4 above).

Status: In 1995 and 1996, CDFG conducted habitat surveys along Palmer Creek and discovered large amounts of sediment. Pacific Watershed Associates (PWA), under contract with CDFG, performed a sediment source inventory along Palmer Creek Road and concluded the roadway was the source of most of the erosion in the area. PWA proposed reshaping, grading, and

constructing runoff ditches on the existing roadway. In summer 1998, the Agency funded a project to control sediment discharge, improve access for emergency vehicles, and improve road safety on Palmer Creek Road. Through the cooperation of Palmer Creek Fire Association, the Agency contracted to reshape the road and eliminate in-board ditches, resurface the roadway with blue shale, and replace remaining culverts to control erosion. In addition, rolling dips were graded into the roadbed to properly drain the roadway. With the reduction of sediment entering Palmer Creek, salmonid spawning habitat is expected to improve. The completion of this project also provides a model for other agencies and landowners to properly maintain rural roads, which potentially impact many streams throughout the Russian River basin. The budgeted cost for labor and materials to the Agency was $15,000-20,000.

Redesigned rural road reduces sediment to Palmer Creek

13. FISH RESCUE ACTIVITIES

Description: As part of its water supply and transmission system, the Agency operates eight infiltration ponds adjacent to the Russian River at the Mirabel and Wohler collection facilities. During flood events, river water overtops the levees around the ponds. Fish that enter during floods become trapped when the water recedes. Concerned about the survival of steelhead, coho, and chinook salmon, the Agency performs annual fish rescue operations to remove fish from the ponds.

Status: In winter and spring 1998, the Agency's Mirabel and Wohler infiltration ponds flooded from high flows in the Russian River. As ponds flooded, fish moved into ponds and became trapped when the river levels receded. Trapped fish were captured using nets, identified to species, and immediately released in the Russian River. A total of 10 juvenile chinook salmon, 66 juvenile hatchery steelhead, 12 juvenile wild steelhead, and an estimated 4,445 non-salmonid species were caught. Fish mortalities were limited to 2 chinook salmon and 13 hatchery steelhead. Initially, juvenile chinook salmon were misidentified in the field as coho salmon and corrected with genetic analysis by the Bodega Bay Marine Laboratory. The budgeted cost for labor to the Agency was $15,000-20,000.

Fish rescue at an infiltration pond along the Russian River